

# Static to live: Combining Stata with Google Charts API

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# Overview

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# Motivation

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- Presenting data through graphics that are transparent
- Reporting through interactive web-based graphics
- Combining Google Charts API with Stata (screenshots in next slide) <https://developers.google.com/chart/>
  - Full suite of graphs
- Standardizing syntax for ease of use

# Introduction

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- Introducing **gcharts** – beta version
  - Modeled after **twoway** command
  - Comprehensive library
  - No need for external software
  - No need to learn JavaScript and/or HTML
    - No need to parse arrays
  - Easy to automate and update graphics

# The process

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# Translating this:

```
var formatternum1 = new google.visualization.NumberFormat({
  pattern: '$#,###.##'
});
var formatternum2 = new google.visualization.NumberFormat({
  pattern: '$#,###'
});
var formatternum3 = new google.visualization.NumberFormat({
  pattern: '%##'
});
formatternum1.format(data, 1);
formatternum2.format(data, 2);
formatternum3.format(data, 3);
var options = {
  legend: {
    alignment: 'center',
    position: 'bottom',
  },
  series: {
    0: {
      pointsVisible: false, pointSize: 8,
      color: 'green', lineWidth: 4,
    },
    1: {
      pointShape: 'star', pointSize: 10,
      color: 'blue', lineWidth: 3,
    }
  },
  title: 'SP500',
  titleTextStyle: {
    color: 'blue',
  },
  chartArea: {
    backgroundColor: {
      strokeWidth: 6,
      fill: '#82c0e9',
      stroke: '#c10534'
    }
  },
},
```

# To this:

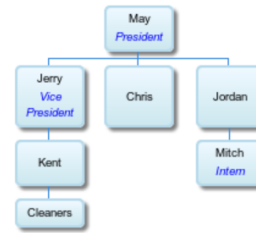
```
gchart area open high close date, msymbol(none star triangle) ///
  msize(medium 10 vsmall) ///
  legend(alignment(center) position(bottom)) ///
  lwidth(medthin thin medthick) ///
  title("SP500", color(blue)) ///
  nformat(open "$#,###.##" high "$#,###" close "%##") ///
  mcolor(green blue red) ///
  orientation(vertical) ytitle("date", color(green) font(calibri) italic) ///
  xlabel(#10, format($#,###)) yscale(reverse) ylabel(#20, format(yy-d-MMM)) ///
  xline(1350, lcolor(green)) ///
  selectmode(multiple) curve(none function function) ///
  crosshair(both, scolor(orange) hcolor(red)) ///
  plotregion(fcolor(eltblue) lwidth(medthick) lcolor(cranberry)) ///
  replace graphregion(fcolor(gray) lcolor(black) lwidth(vvthick)) step
```

# Google Chart Suite

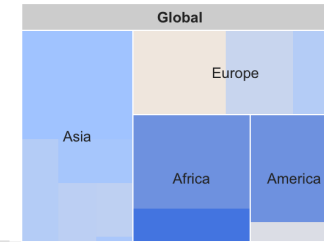
---

# Google Chart Gallery

Org Chart



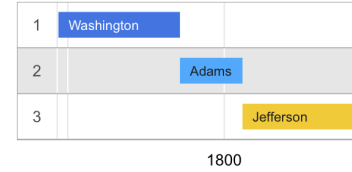
Treemap



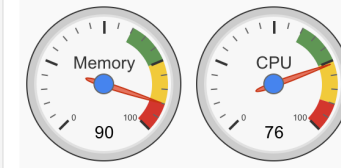
Table

	Name	Salary	Full Time
1	Marie	\$24,700	✓
2	Albert	\$25,200	x
3	Enrico	\$25,700	✓
4	Lise	\$26,600	✓

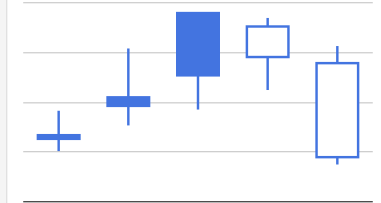
Timeline



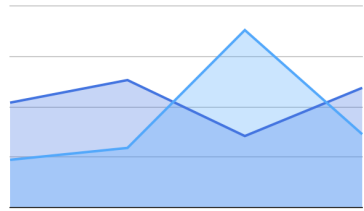
Gauge



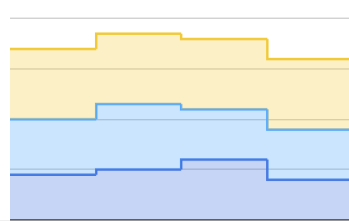
Candlestick Chart



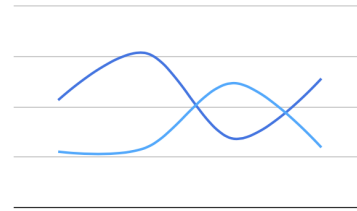
Area Chart



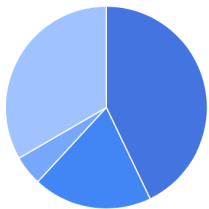
Stepped Area Chart



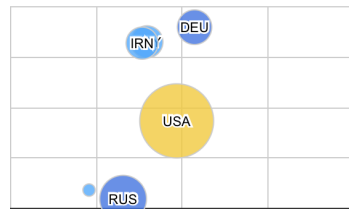
Line Chart



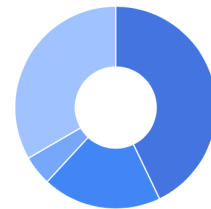
Pie Chart



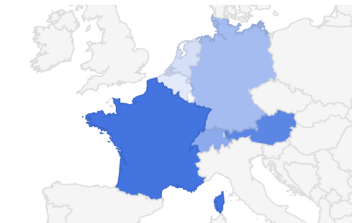
Bubble Chart



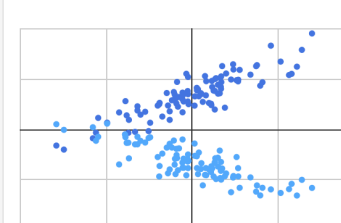
Donut Chart



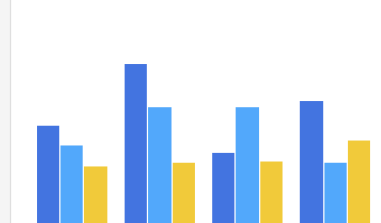
Geo Chart



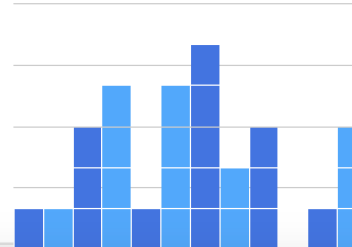
Scatter Chart



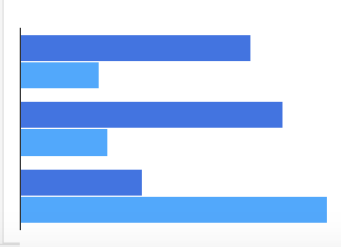
Column Chart



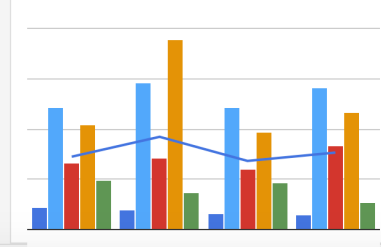
Histogram



Bar Chart



Combo Chart





gcharts (beta)

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# Available `gchart` types in this release

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- Scatter
- Line
- Column/Bar
- Area
- Pie/Donut
- Bubble
- Org Chart
- Sankey
- Treemap
- Gauge
- Gantt
- Calendar

# Stata-like graph options

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# Stata-like options

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- Line options:
  - `lwidth()`, `lcolor()`, `lpattern()`
- Scatter options:
  - `msymbol()`, `mcolor()`, `msize()`
- Label options:
  - `xlabel()`, `ylabel()`, `xtitle()`, `ytitle()`, `xscale()`, `yscale()`, `xline()` `yline()`
- Legend options
- Title options
- Plot and graph region options

# Google chart options

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# Google chart-specific options

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We tried making all Google chart configuration options as “Stata” like as possible. Some of them include:

- `crosshair()`
- `selectmode()`
- `trendlines()`
- `mfcolor()`
- `opac()`

# Google charts examples

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# Example – table chart

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<https://developers.google.com/chart/interactive/docs/gallery/table>

Let's say we want to create an HTML table. Using **gcharts** and `sysuse auto`, we type:

```
Command
gchart table price mpg (lab) foreign (bool) foreign (val) make foreign rep78 (bool) rep78 in 1/10

belenchavez > gcharts > ☰
```

Notice how it looks a lot like collapse



# Example – table chart

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Resulting in:

Price	Mileage (mpg)	Car type	Car type	Make and Model	Car type	Repair Record 1978	Repair Record 1978
4,099	22	Domestic	x	AMC Concord	0	3	x
4,749	17	Domestic	x	AMC Pacer	0	3	x
3,799	22	Domestic	x	AMC Spirit	0		
4,816	20	Domestic	x	Buick Century	0	3	x
7,827	15	Domestic	x	Buick Electra	0	4	x
5,788	18	Domestic	x	Buick LeSabre	0	3	x
4,453	26	Domestic	x	Buick Opel	0		
5,189	20	Domestic	x	Buick Regal	0	3	x
10,372	16	Domestic	x	Buick Riviera	0	3	x
4,082	19	Domestic	x	Buick Skylark	0	3	x

# Example – Sankey diagram

<https://developers.google.com/chart/interactive/docs/gallery/sankey>

Let's say we want to look at the flow of customers to and from different rates. Sankey Diagrams are useful for visualizing flows of data. Our example data looks like:

	rate_from	rate_to	custs
1	DR	ALTOU	10
2	DR	DR-SES	11
3	ALTOU	DR-SES	4
4	DR	DRLI	5
5	DRLI	DR-TOU	4
6	DR	EVTOU	2
7	DR	DR-TOU	2
8	DR	ALTOU	4
9	DRLI	EVTOU	3
10	DRLI	DR-SES	3
11	DR-SES	DR-TOU	5

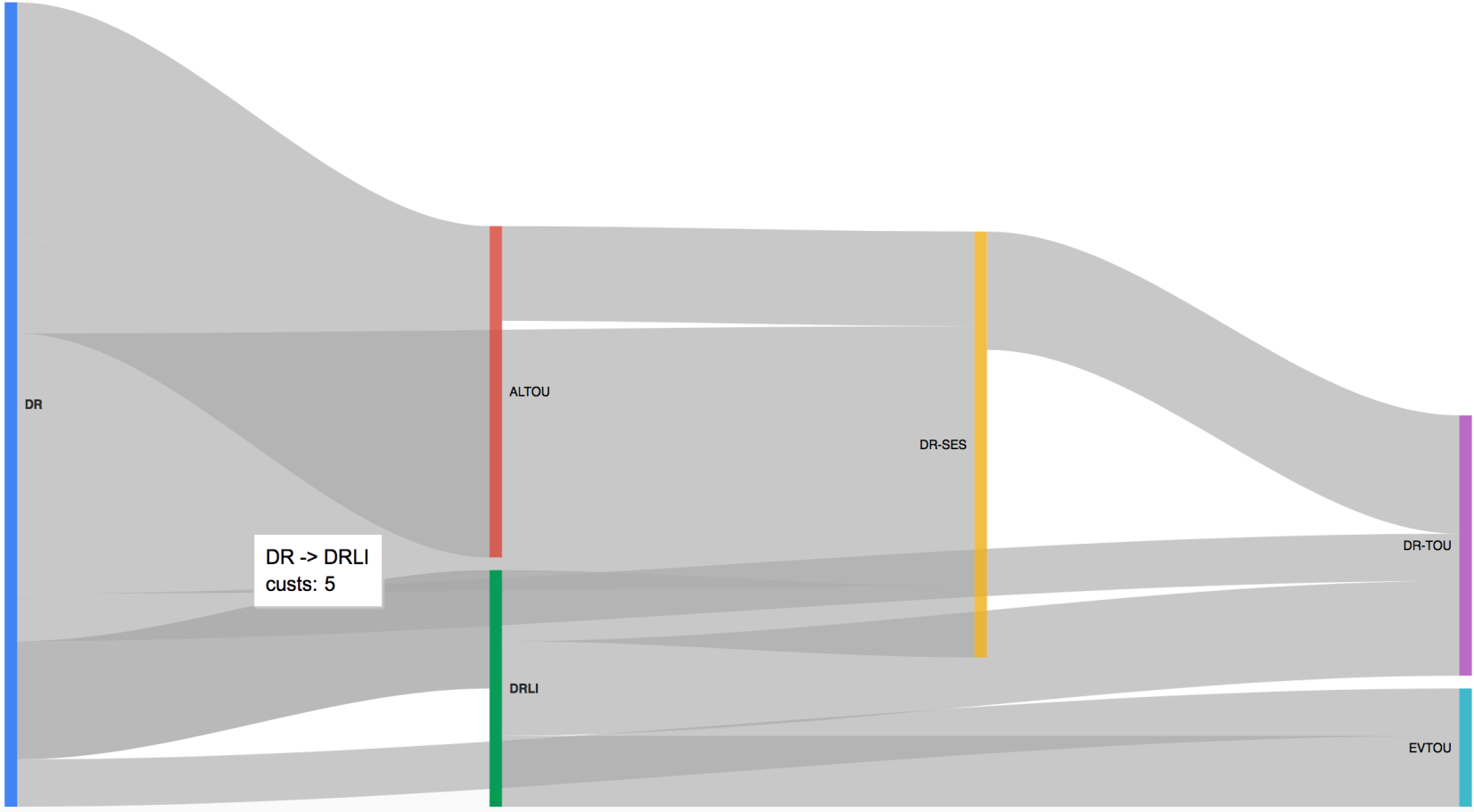
To create a Sankey diagram using **gcharts** we type:

```
Command
gchart sankey, from(rate_from) to(rate_to) weight(custs)
```

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# Example – Sankey diagram

Resulting in:



# Example – calendar chart

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<https://developers.google.com/chart/interactive/docs/gallery/calendar>

Suppose we want to look at monthly or weekly trends in a year. Calendar charts are useful for that. Let's look at the daily average temperature at SeaTac airport in 2015.

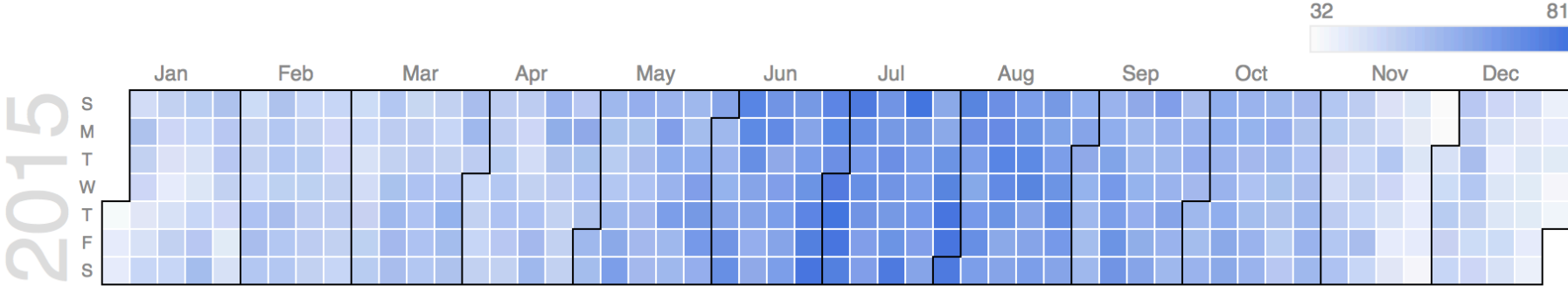
Using **gcharts** this looks like:

```
Command
gchart calendar temp date
```

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# Example – calendar chart

Resulting in the following default chart:

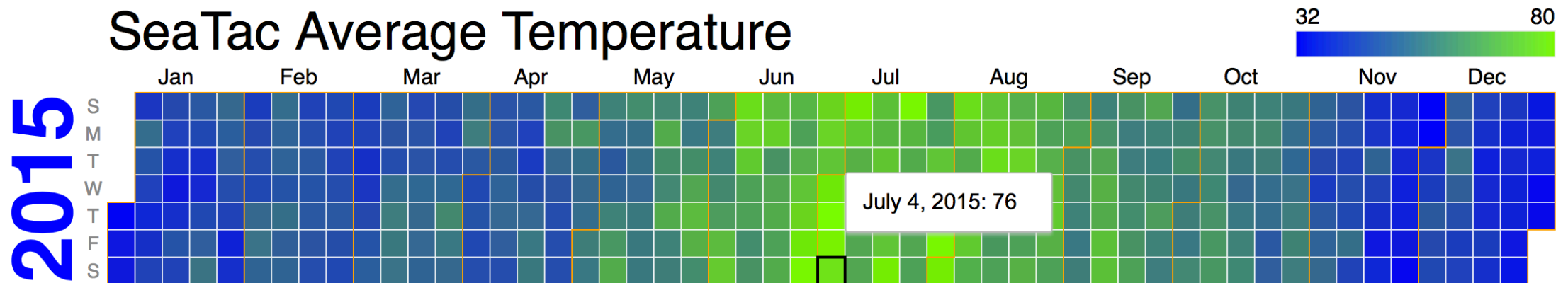


# Example – calendar chart

Let's add in a title and a few other options:

```
gchart calendar temp date, title("SeaTac Average Temperature") gsize(20) ///
  gc(opac(0.75)) mfcolor(blue lawngreen) ///
  ylabel(color(blue) bold) outline(color(orange)) ///
  molab(color(black))
```

This gives us:



# Stata-like charts

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# Example – line chart

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<https://developers.google.com/chart/interactive/docs/gallery/linechart>

In this example we'll be using S&P500 (sysuse sp500)

Using **gcharts** we type:

**Command**

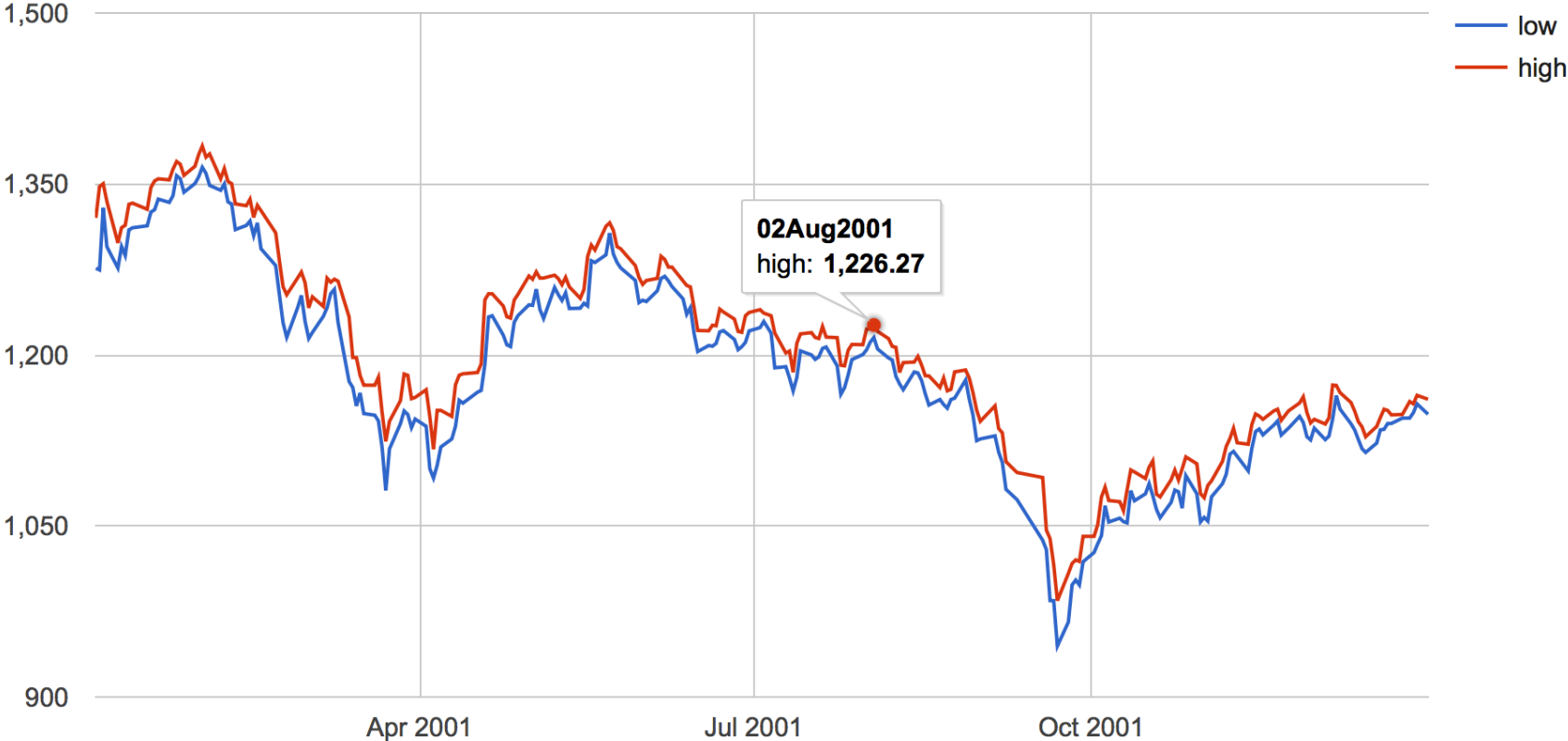
```
gchart line low high date
```

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Resulting in:



# Example – line chart



# Example –bar chart

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Stata bar charts are known as “vertical bar” charts or “column charts” in Google Charts

<https://developers.google.com/chart/interactive/docs/gallery/columnchart>

The options are similar as line charts. Let’s continue working with S&P500 data.

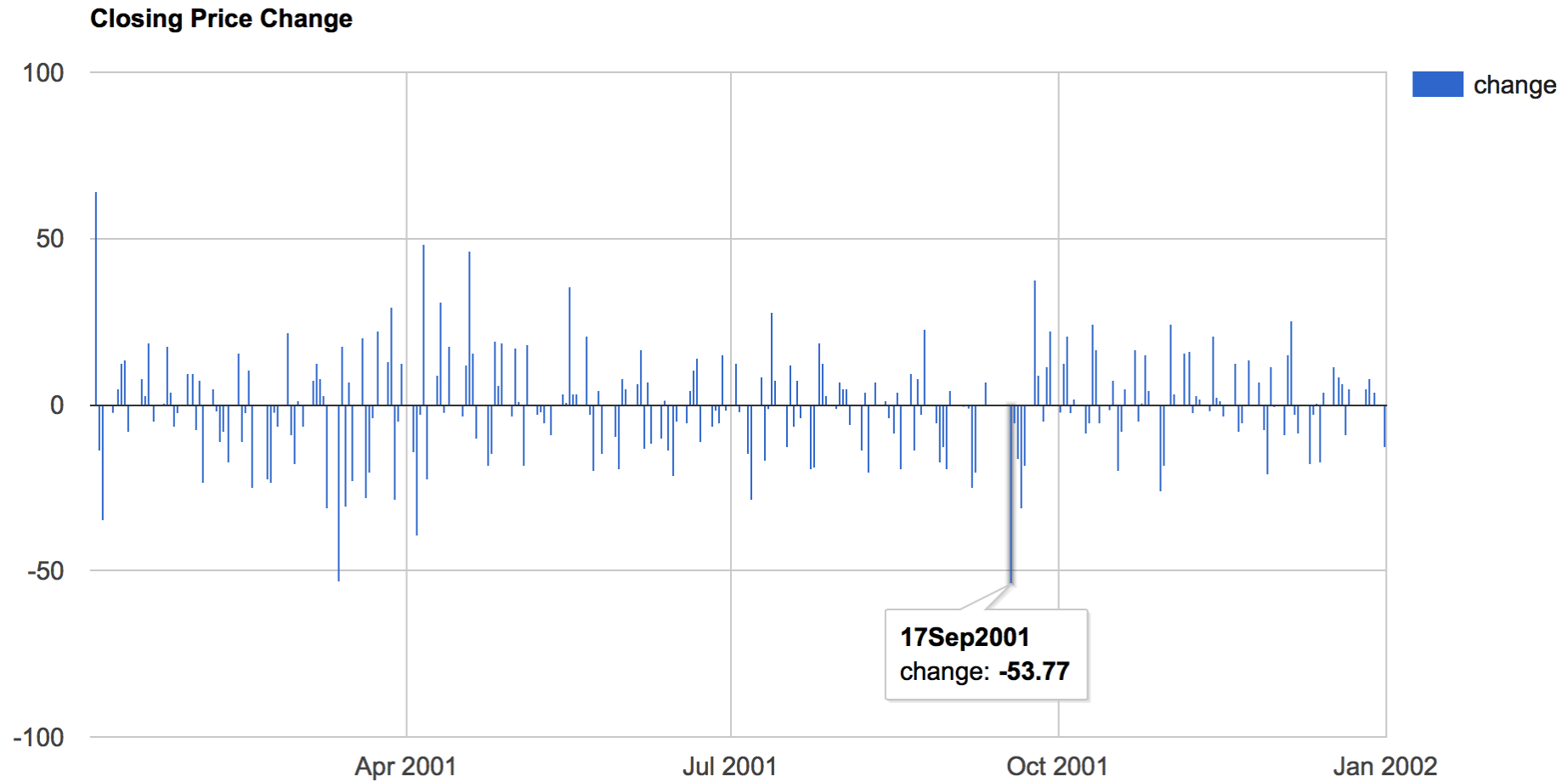
Using **gcharts**, we type:

```
Command
gchart column change date, title("Closing Price Change")
```

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Which gives us the following graph:

# Example –bar chart



# Example – scatter chart

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<https://developers.google.com/chart/interactive/docs/gallery/scatterchart>

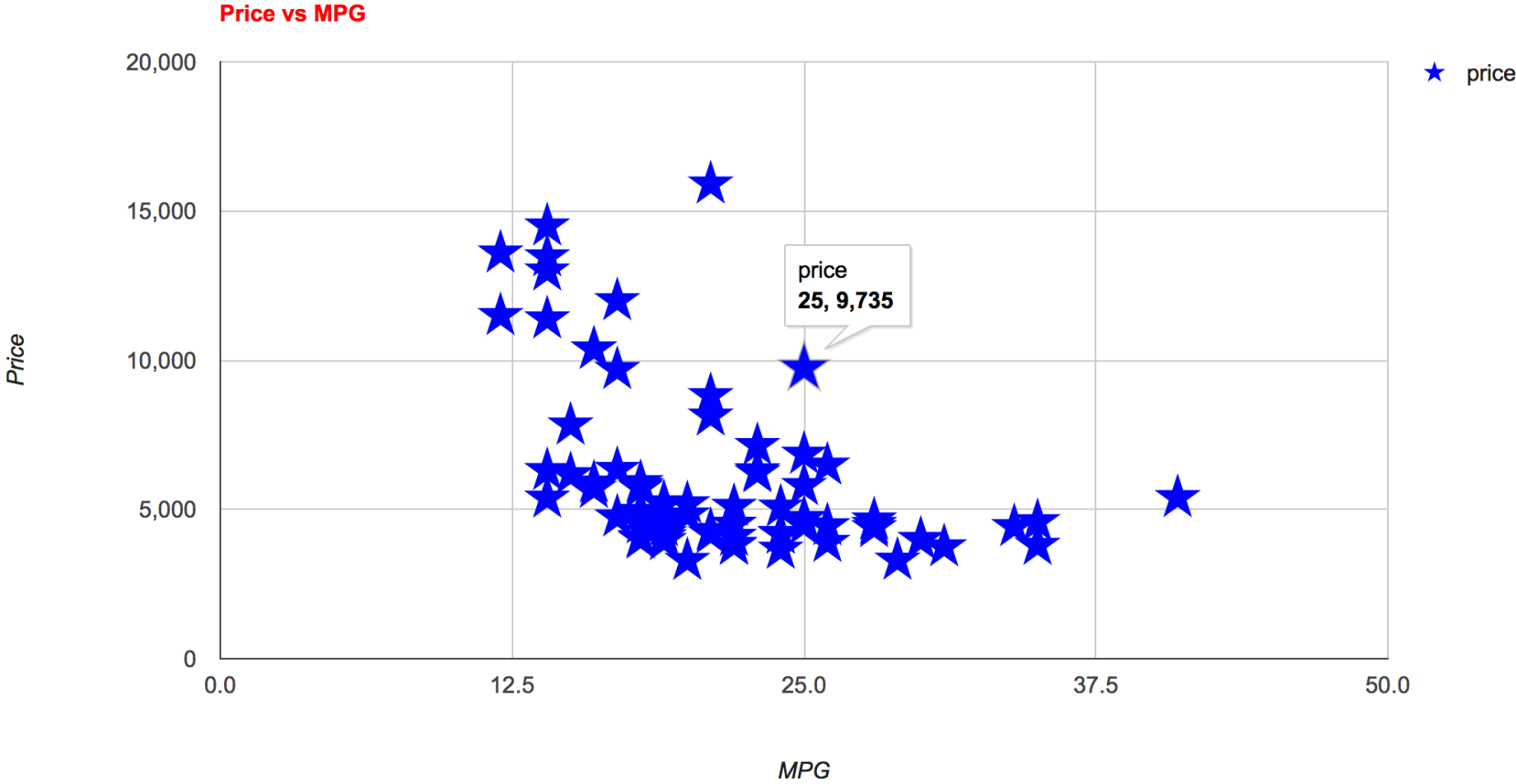
Scatter is also very similar. Let's use the auto dataset to create a scatter plot of price versus MPG

Using **gcharts** we type:

```
gchart scatter price mpg, msymb(star) mcolor(blue) msize(vhuge) ///  
  title("Price vs MPG", color(red)) xtitle("MPG") ytitle("Price")
```

Which gives us:

# Example – scatter chart



# Example – pie chart

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<https://developers.google.com/chart/interactive/docs/gallery/piechart>

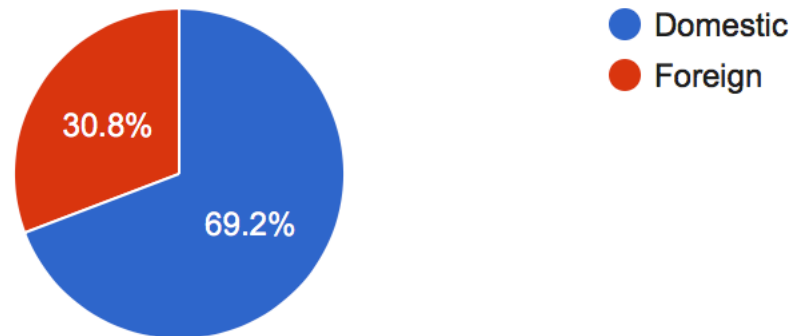
In this example we'll make a pie chart of car prices by type

## Command

```
gchart pie price, over(foreign)
```

🏠 belenchavez > 📁 gcharts > ☰

This gives us:



# For more examples

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- A portfolio of examples with additional options is available at: [www.belenchavez.com/stata](http://www.belenchavez.com/stata)

# Future **gchart** types (available soon)

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- Timeline
- Intervals
- Histogram
- Candlestick/Waterfall
- Diff Charts



# Future **gchart** features (available soon)

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- Multiple axis charts (secondary axis options)
  - Improved integration with combo charts
- Bar chart – bar widths
- Making charts by-able

# Questions?

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# Contact Information

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## William Matsuoka

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## Belen Chavez

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- Twitter: @\_belenchavez

\* Not affiliated with Stata, we just like it. A lot.

# Additional Examples

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# Example – combo chart

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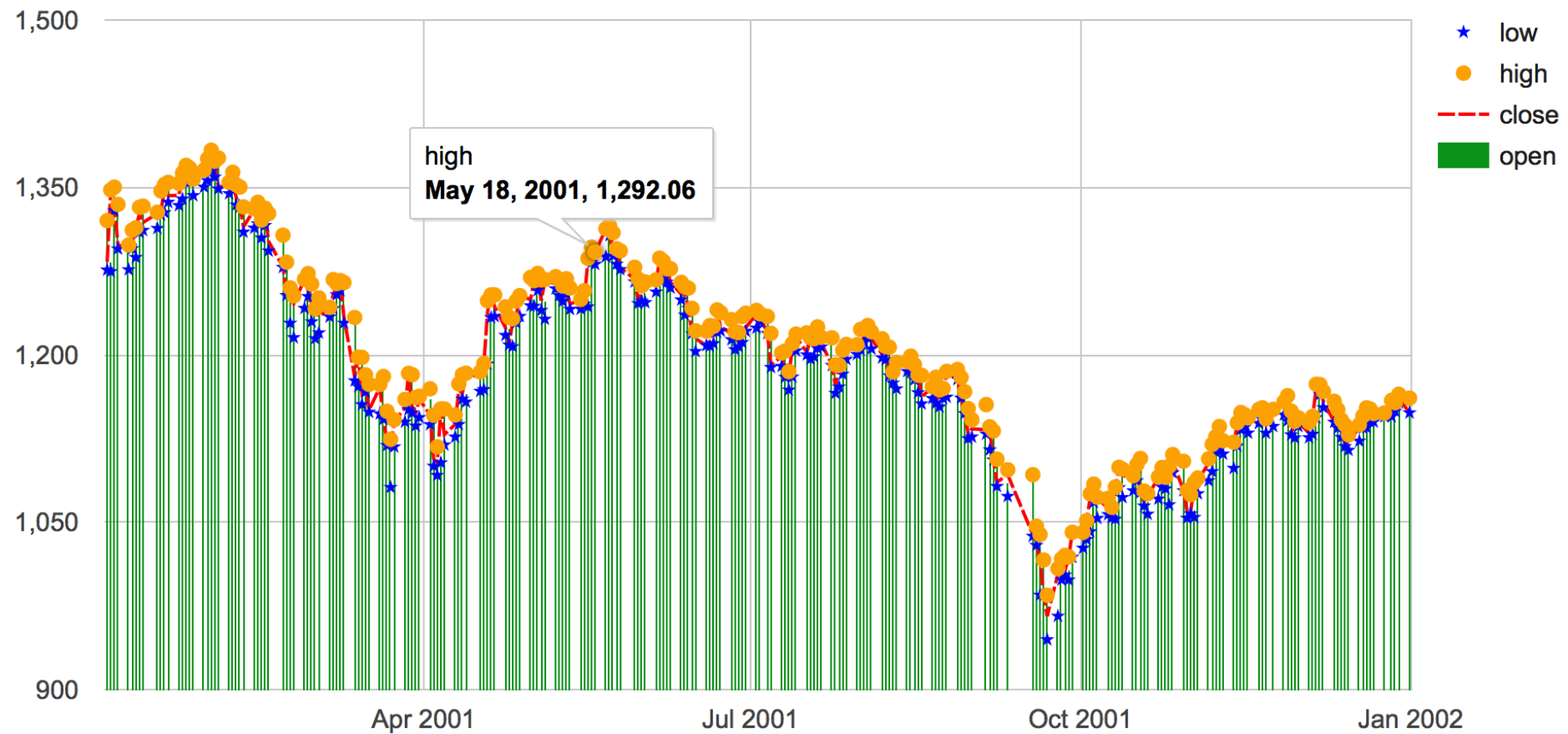
<https://developers.google.com/chart/interactive/docs/gallery/combochart>

We can combine different chart types into one. The possible types of series are bars, line, area, scatter, and stepped area.

Using **gcharts**, let's combine line, scatter and a bar chart together.

```
gchart (scatter low high date, msymbol(star circle) mcolor(blue orange)) ///  
      (line close date, lpattern(dash) lcolor(red)) (bar open date)
```

# Example – combo chart



# Example – table chart











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Let's add a few more options to our table chart example:

```
gchart table price mpg (lab) foreign (bool) foreign (val) make foreign rep78 ///
  (bool) rep78 in 1/10, html format(arrow(1, base(4000)) ///
  bar(2, base(20) barl) color(7, addrange(3,4,"orange", "yellow") ///
  addrange(1,3,"red", "blue"))) ///
  style(header(fcolor(red)) oddrow(fcolor(green)) ///
  hoverrow(fcolor(lilac) bold italic ))
```

This gives us the following informative yet overwhelming table:

# Example – table chart

Price	Mileage (mpg)	Car type	Car type	Make and Model	Car type	Repair Record 1978	Repair Record 1978
▲ 4,099	 22	Domestic	x	AMC Concord	0	3	x
▲ 4,749	 17	Domestic	x	AMC Pacer	0	3	x
▼ 3,799	 22	Domestic	x	AMC Spirit	0		
▲ 4,816	 20	Domestic	x	Buick Century	0	3	x
▲ 7,827	 15	Domestic	x	Buick Electra	0	4	x
▲ 5,788	 18	Domestic	x	Buick LeSabre	0	3	x
▲ 4,453	 26	Domestic	x	Buick Opel	0		
▲ 5,189	 20	Domestic	x	Buick Regal	0	3	x
▲ 10,372	 16	Domestic	x	Buick Riviera	0	3	x
▲ 4,082	 19	Domestic	x	Buick Skylark	0	3	x



# Example – sankey diagram

---

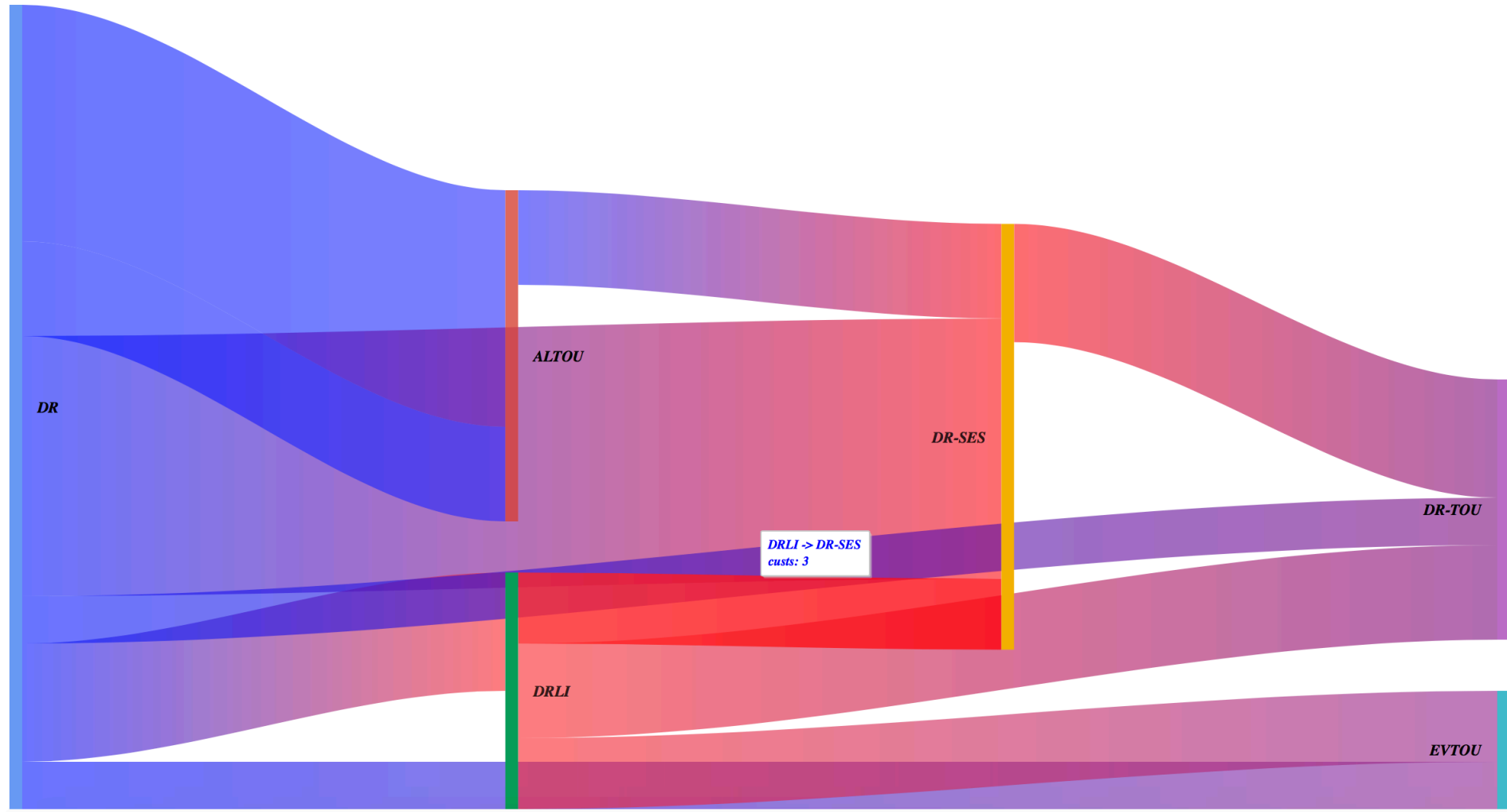
Adding in a few more features to our sankey example:

```
gchart sankey, from(rate_from) to(rate_to) weight(custs) node(nodepadding(40) ///  
  labelpadding(12) width(10) interactivity  
  label(font("Times-Roman") size(12) italic bold)) ///  
  link(colormode(gradient) color(fcolor("#efd")) ///  
  colors(blue red purple brown)) ///  
  tooltip(text(bold italic font("Times-Roman") size(10) color(blue)))
```

This results in the following visualization:

# Example – sankey diagram

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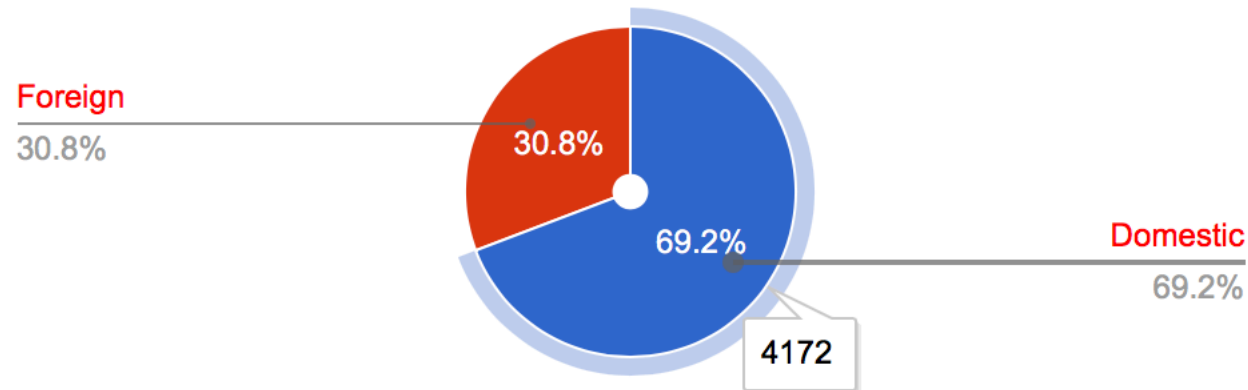
# Example – pie chart

---

Adding a few more options:

```
gchart pie price, width(100%) height(200 px) name(my_graph) ///  
  tooltip(price, ignore ishtml text(percent) textstyle(color(red) ///  
  font(Calibri)) trigger(selection)) ///  
  legend(textstyle(color(red)) position(labeled) alignment(end)) ///  
  over(foreign) piehole(.1)
```

We get:



# Example – line chart

---

Let's add a title and customize the line graph a bit:

```
sysuse sp500, clear
gchart line low high date, title("S&P500", color(blue) bold) ///
      lcolor(green purple) lwidth(thick medthick) lpattern(dash_dot solid)
```

This gives us the following output:

# Example – line chart

